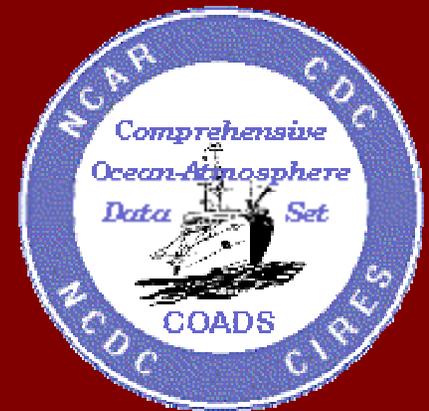


# Overview of the International Marine Observational Archive and COADS

Scott Woodruff (NOAA/CDC)

Workshop on Advances  
in the Use of Historical  
Marine Climate Data

29 January 2002



# Outline

- Background on COADS
  - Release structure
  - Products
- Improvements--unresolved issues:
  - Blend with UK MDB + many other sources
  - 1784-1949  $\Leftarrow$  focus
- Plans:
  - Processing improvements
    - (QC  $\Leftarrow$  Tom Smith and Xiao-Wei Quan)
  - Auxiliary data additions
  - Proposed: International marine observational archive

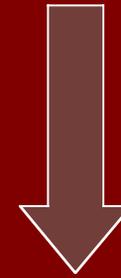
# Comprehensive Ocean- Atmosphere Data Set (COADS)

- Cooperative project since 1981: NOAA + NCAR
- Voluntary Observing Ships, buoys, etc.
- 1985: Release 1 (1854-1979)
  - Individual observations
  - Year-month summaries:  $2^{\circ}$  lat  $\times$   $2^{\circ}$  lon boxes

Open and unrestricted data distribution

# COADS development history

- 1993: Release 1a (now 1980-97)
  - $1^\circ \times 1^\circ$  summaries from 1960
- 1996: Release 1b (1950-79)
- 2001: Release 1c (1784-1949)



Release 2.0 (155M)

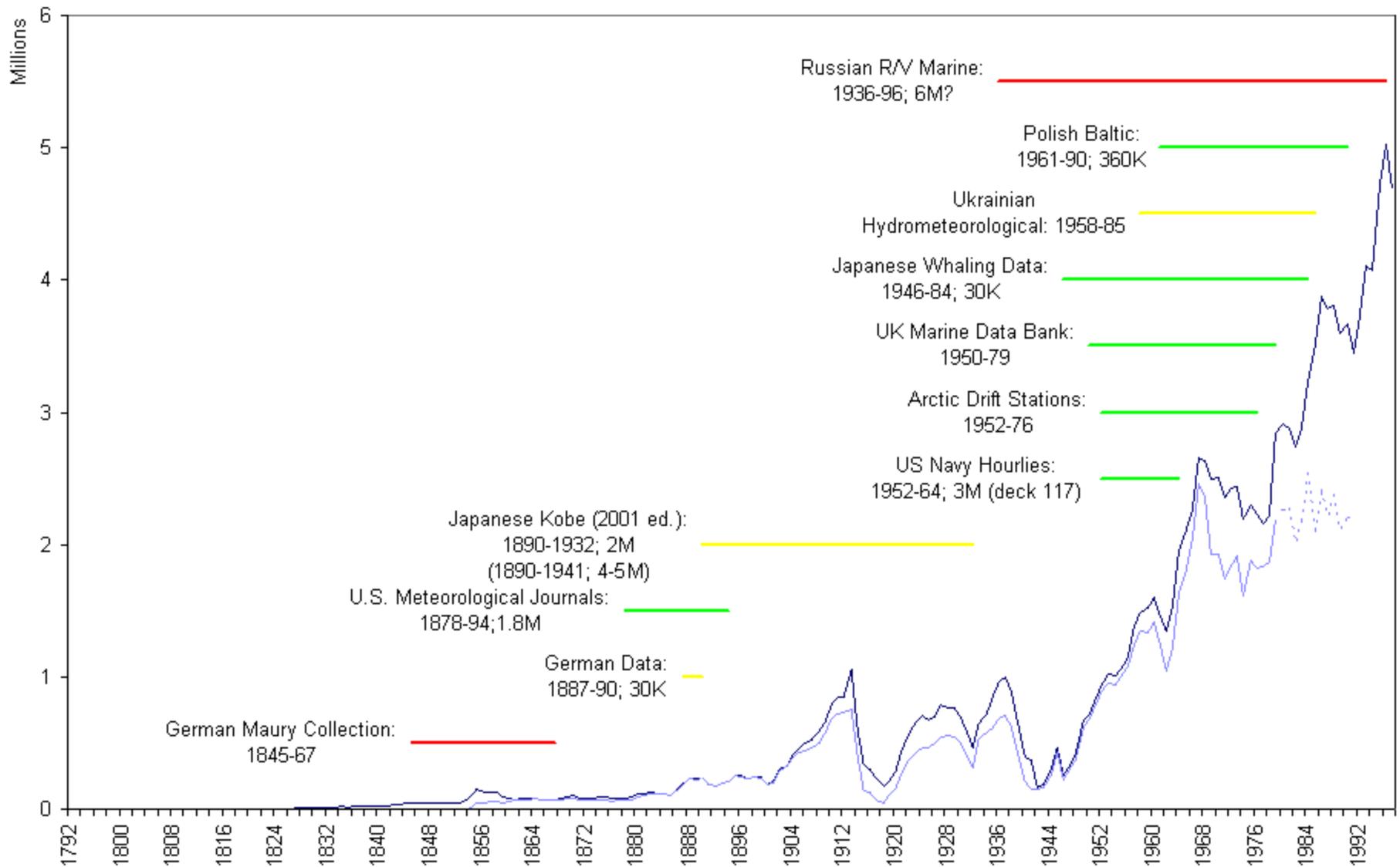
Entire archive: uniform formats (LMRF and MSG)

On-line requests and ascii subsets

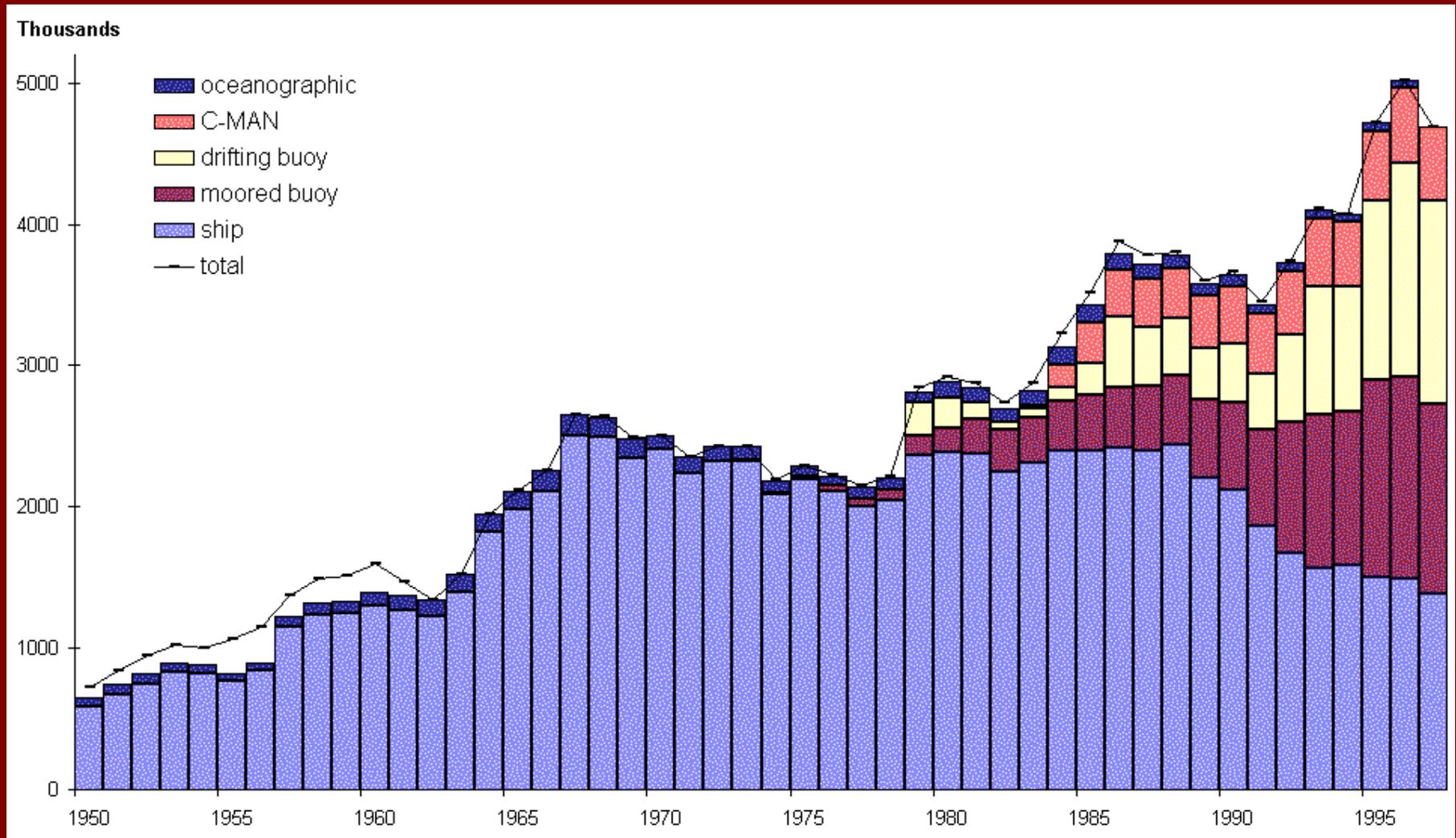
Usage: IPCC and Reanalyses; many other applications

# Release 2.0 (dark blue) vs. Release 1 (light blue) reports/year

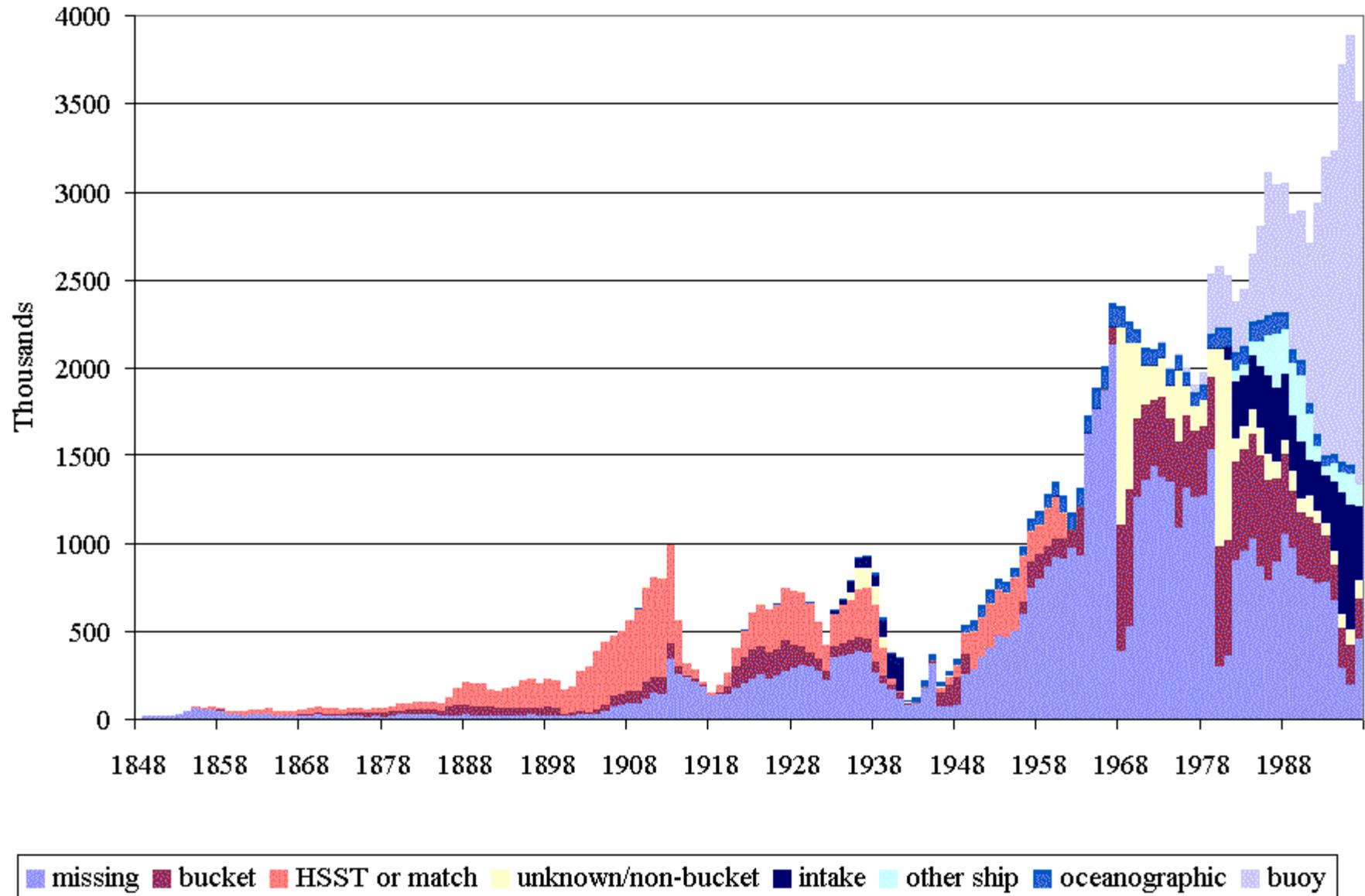
Future blend candidates: red (undigitized), yellow (partly), green (fully)



# Mixture of ship/other data: 1950-97

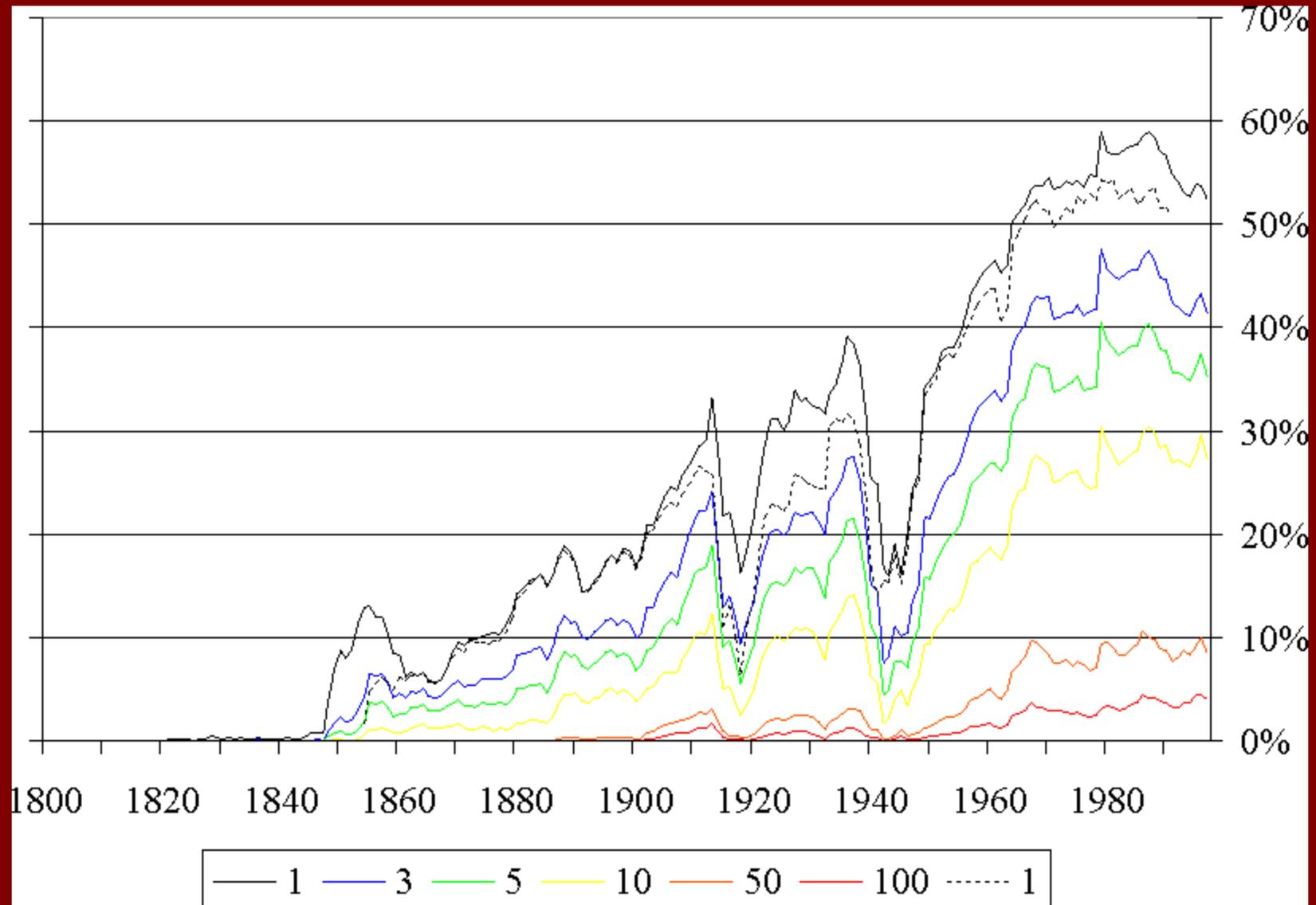


# SST Measurement Method Indicators (simplified)



# SST % of possible (ocean/coastal) coverage

Obs/ $2^\circ$  box: Release 2.0 solid vs. Release 1 dashed



# Data and Information Availability:

Project website  $\Rightarrow$  single point of access

- Publications
- Documentation and data archive evaluations
- Metadata:
  - WMO Pub.-47 (ship instrumentation; 1973-98)
- Data access options:
  - NCAR: binary/ascii subsets  $\Leftarrow$  Steve Worley
  - CDC: netCDF  $\Leftarrow$  Roland Schweitzer
  - NCDC: near-real-time obs (under development)



# Comprehensive Ocean-atmosphere Data Set (COADS)

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**CDC**

[Climate Diagnostics  
Center](#)

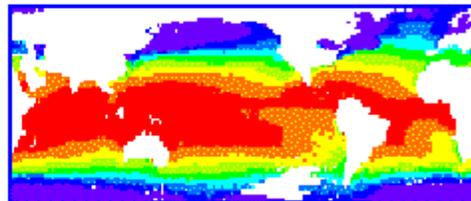
**NCAR**

[National Center for  
Atmospheric Research](#)

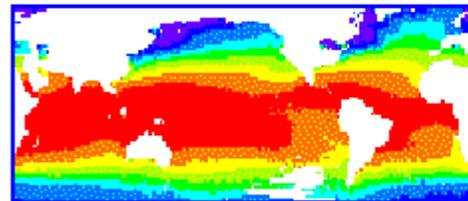
**NCDC**

[National Climatic Data  
Center](#)

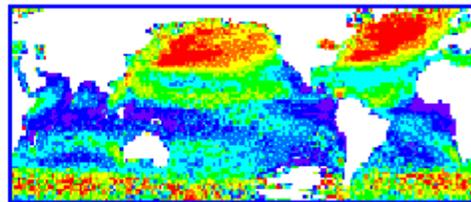
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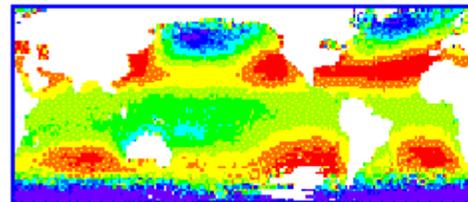
[sea surface temperature](#)



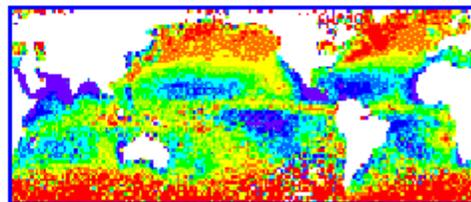
[air temperature](#)



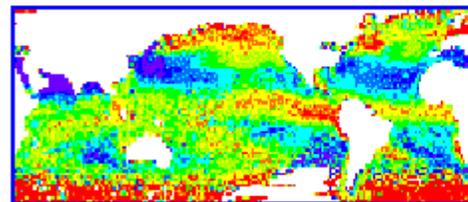
[wind](#)



[sea level pressure](#)



[cloudiness](#)



[relative humidity](#)

[Chronology and News](#)  
[Project Description](#)

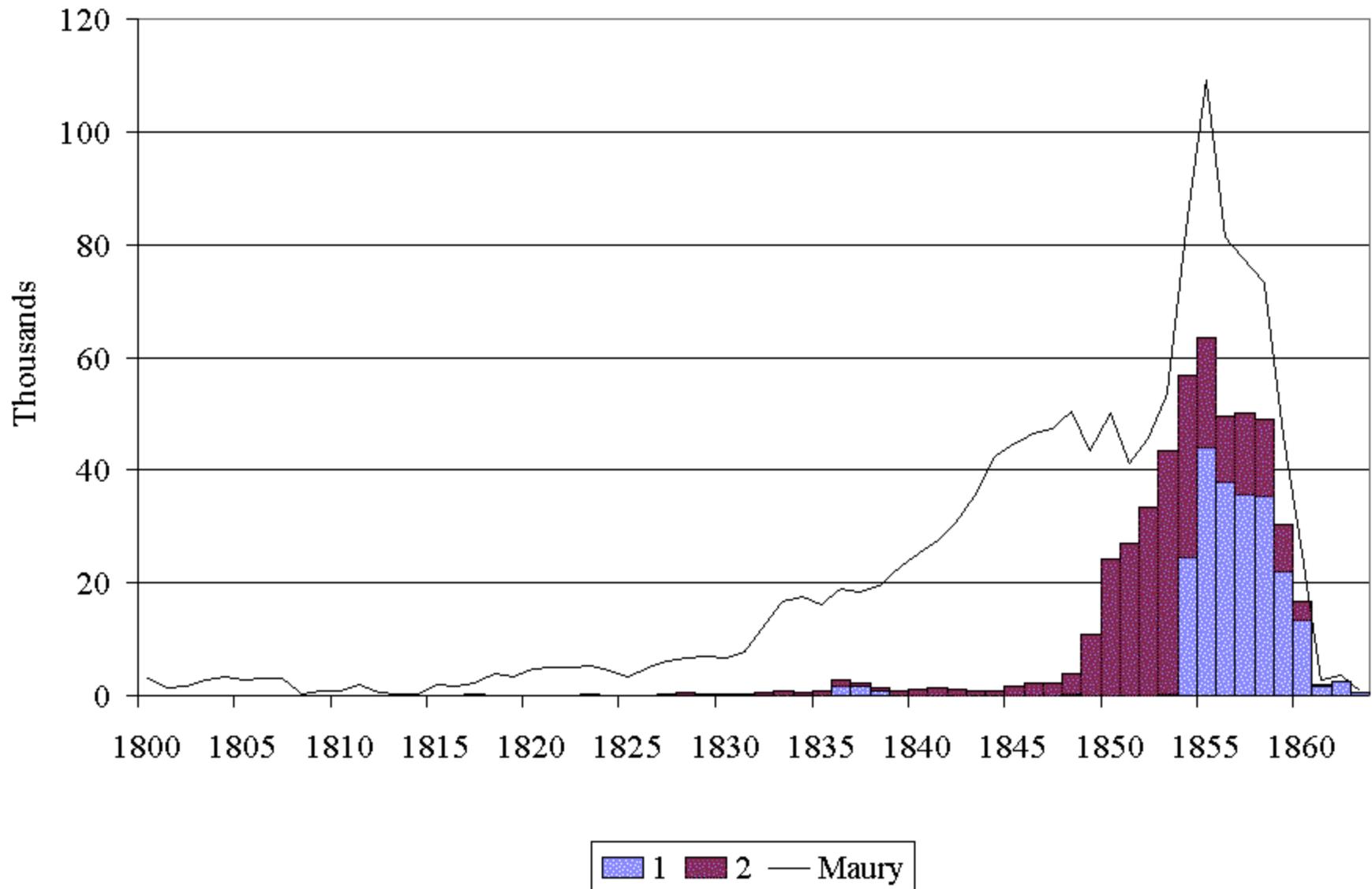
[COADS Data and Metadata](#)  
[Publications](#)

[Contact Points](#)

<http://www.cdc.noaa.gov/coads/>



# Maury Collection (line) and SLP Bias Flags: 2 = gravity 1 = temp + gravity (←Todd Mitchell)



# SST:

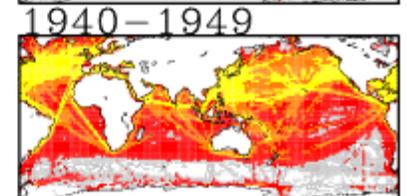
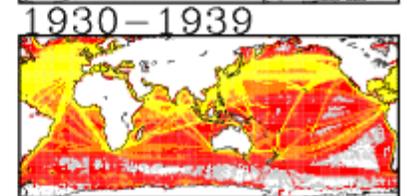
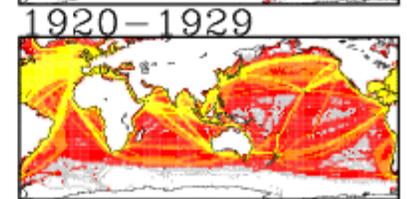
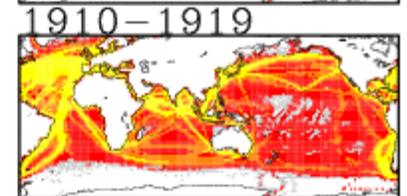
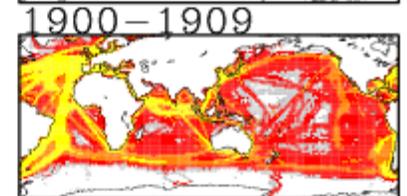
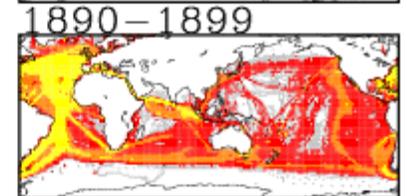
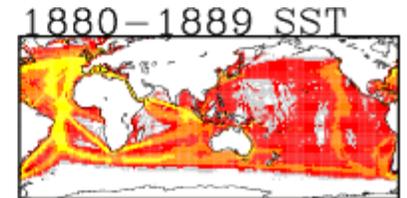
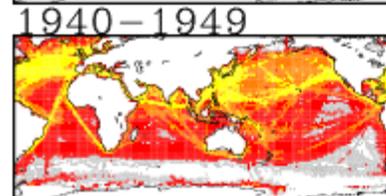
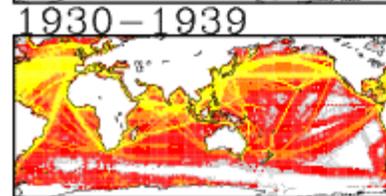
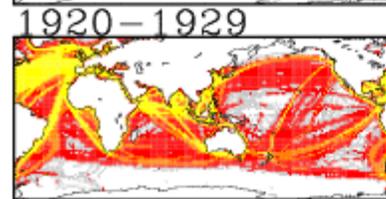
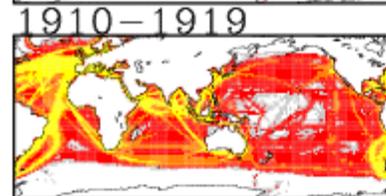
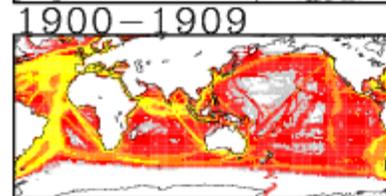
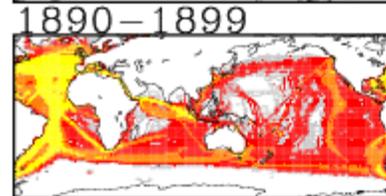
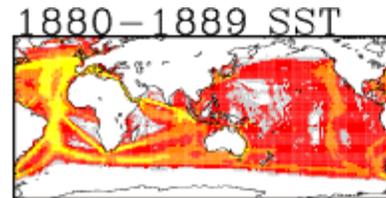
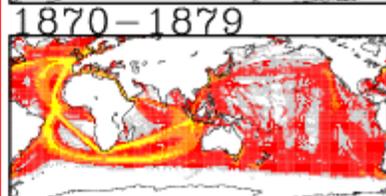
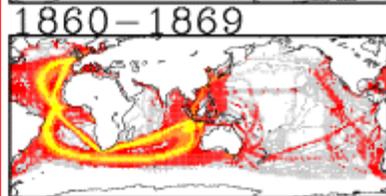
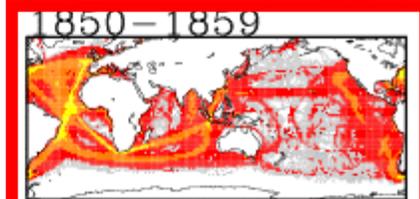
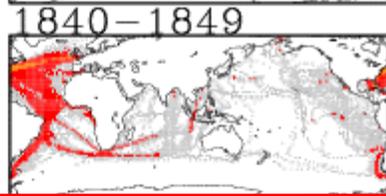
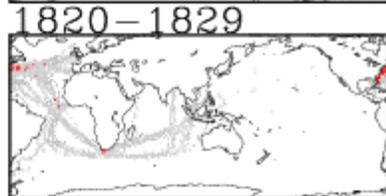
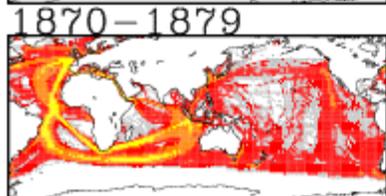
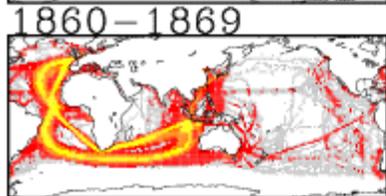
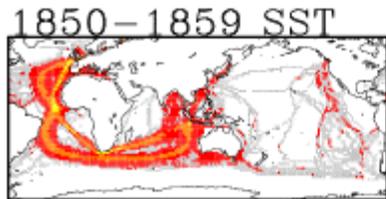
Release 1 (left)

Release 2.0

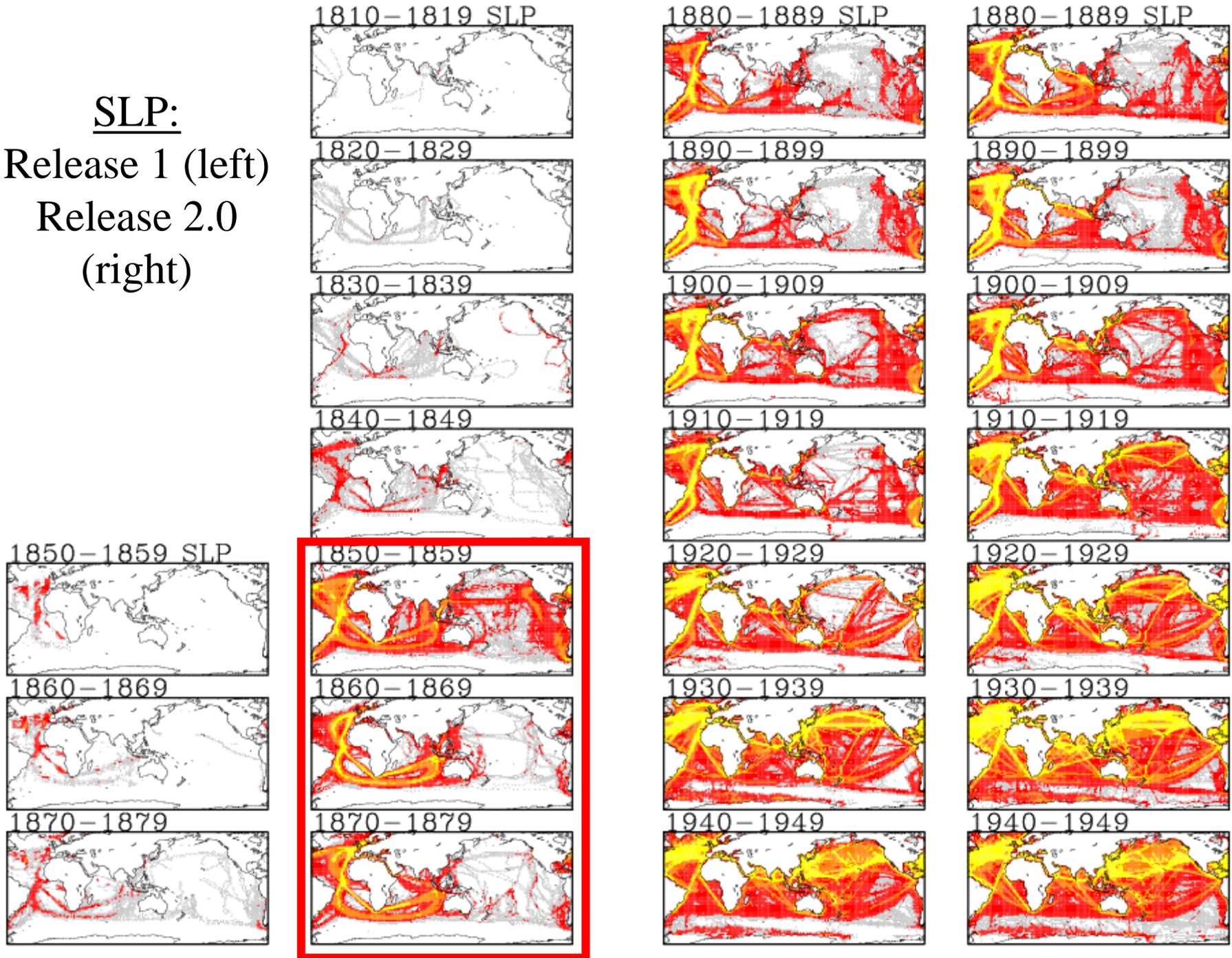
(right)

Obs/2° box/decade:

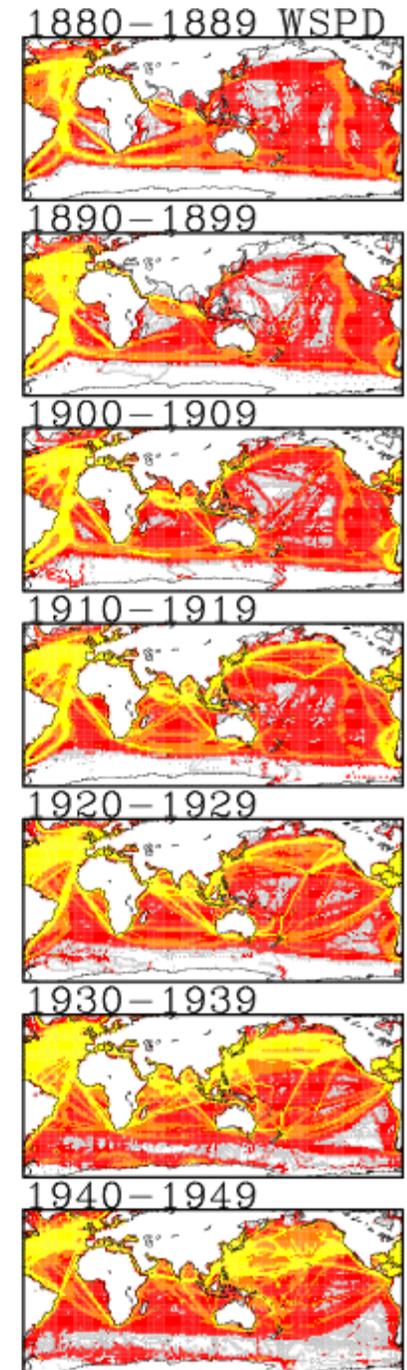
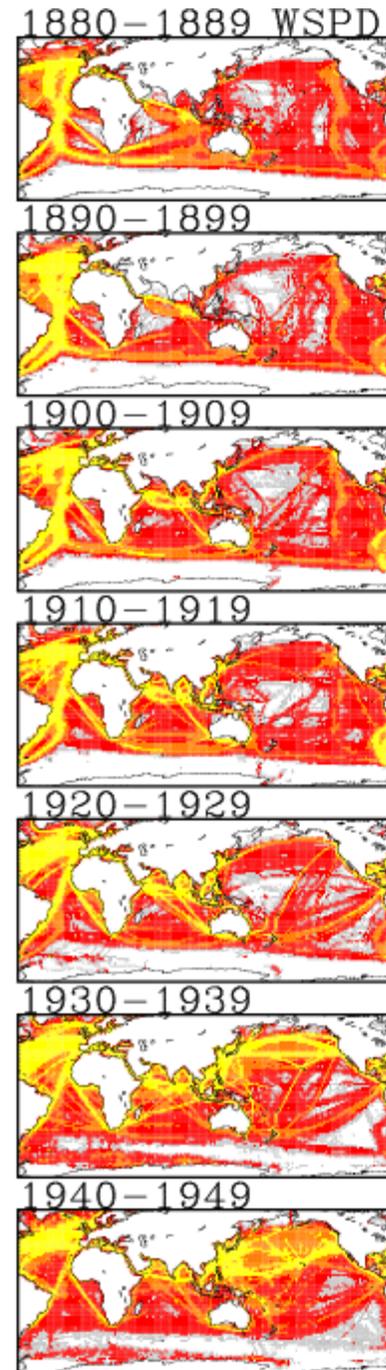
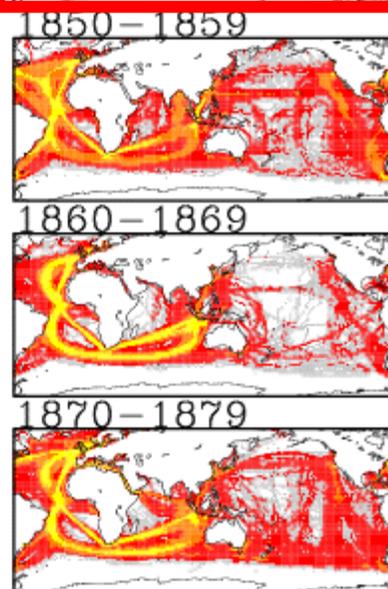
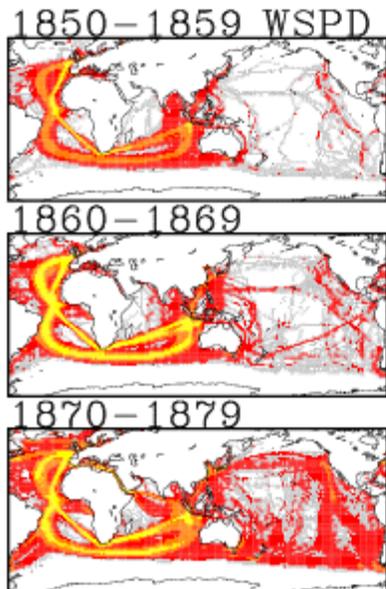
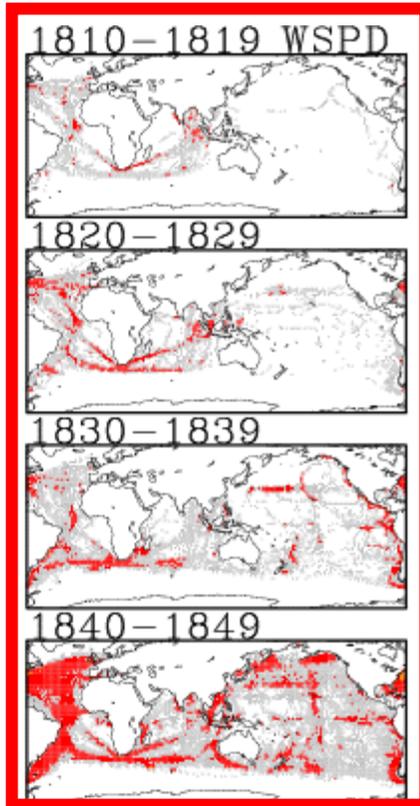
grey	1-9
red	10-99
orange	100-399
yellow	400-



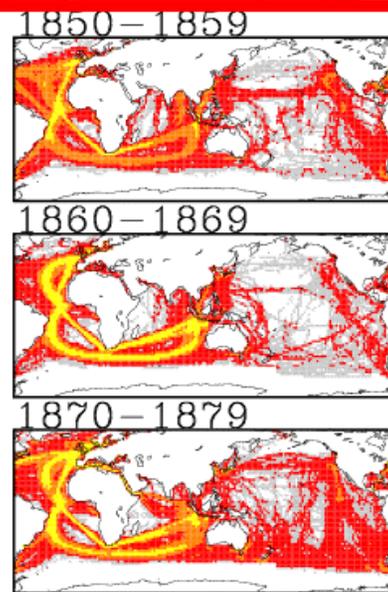
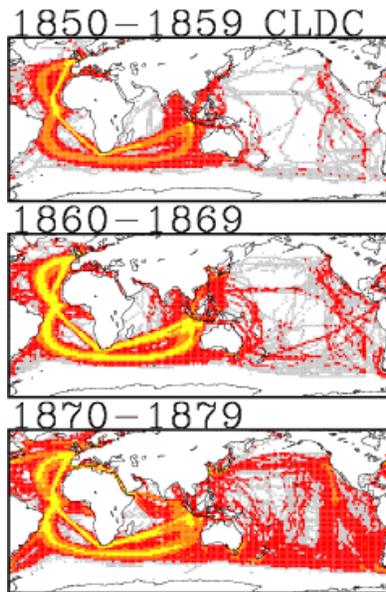
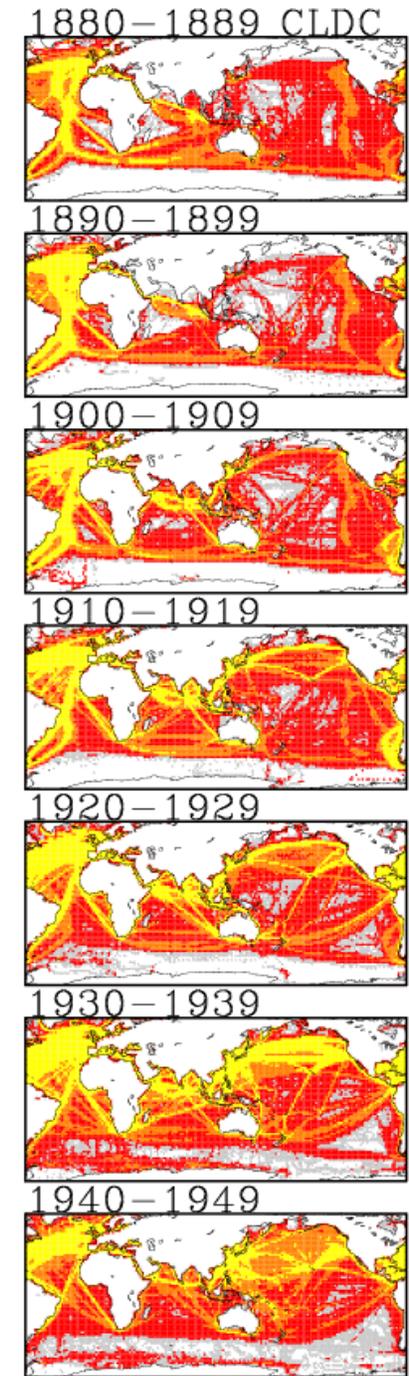
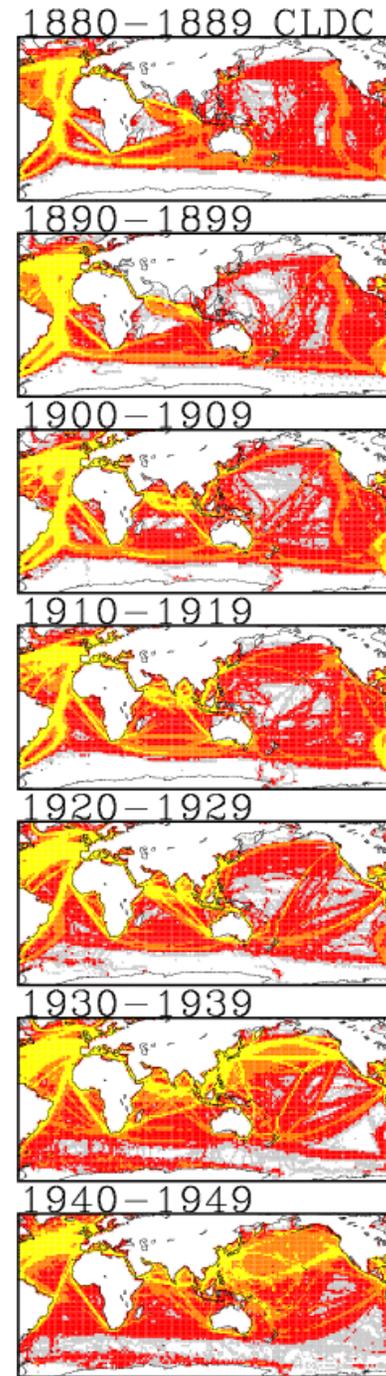
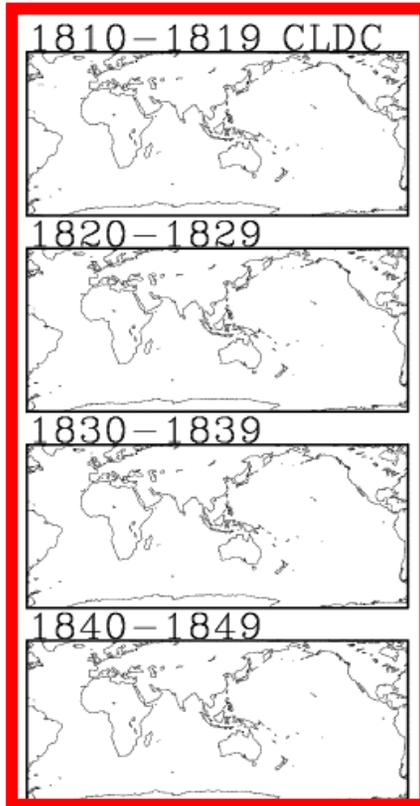
SLP:  
Release 1 (left)  
Release 2.0  
(right)



Wind speed:  
Release 1 (left)  
Release 2.0  
(right)



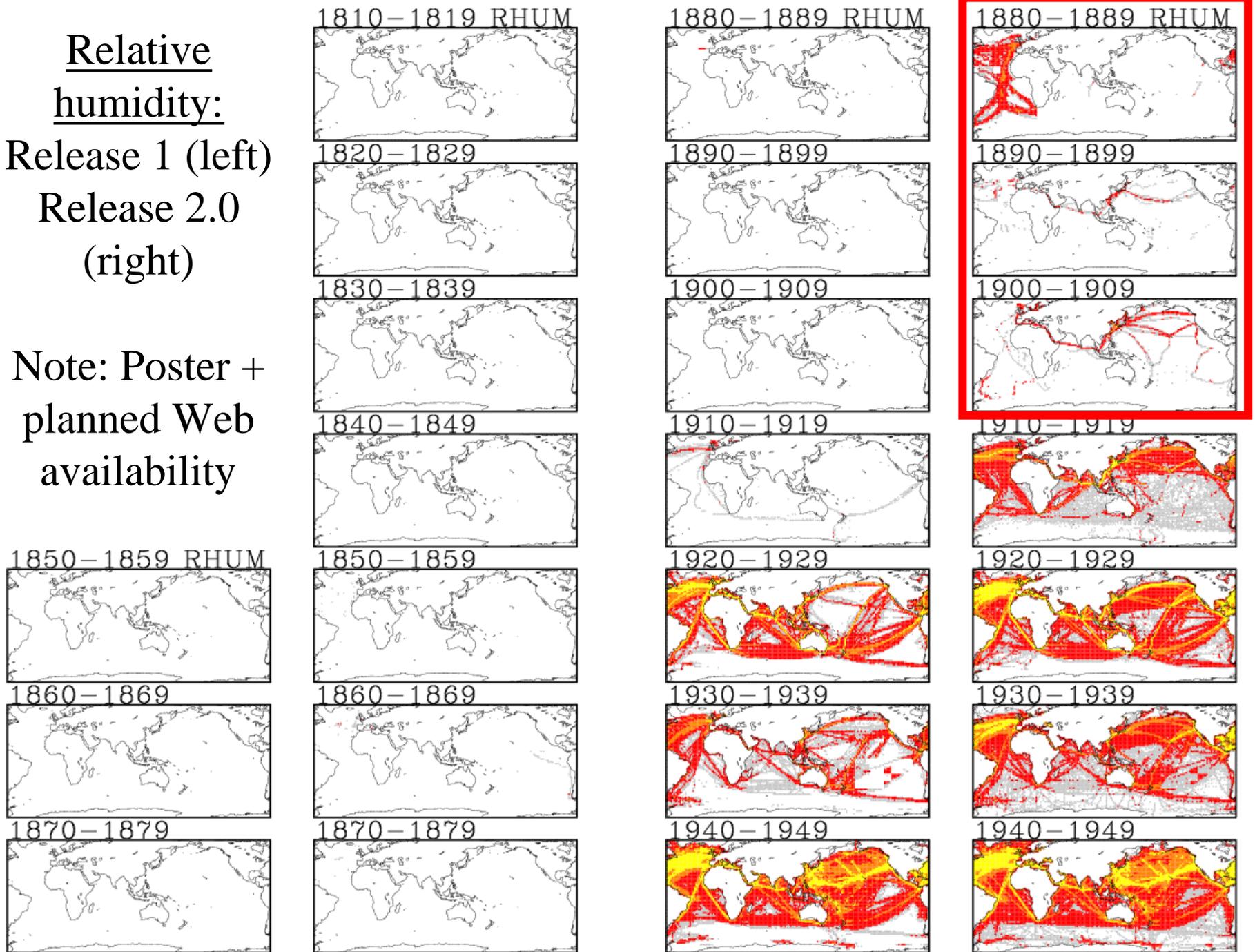
Total Cloudiness:  
Release 1 (left)  
Release 2.0  
(right)



Relative  
humidity:

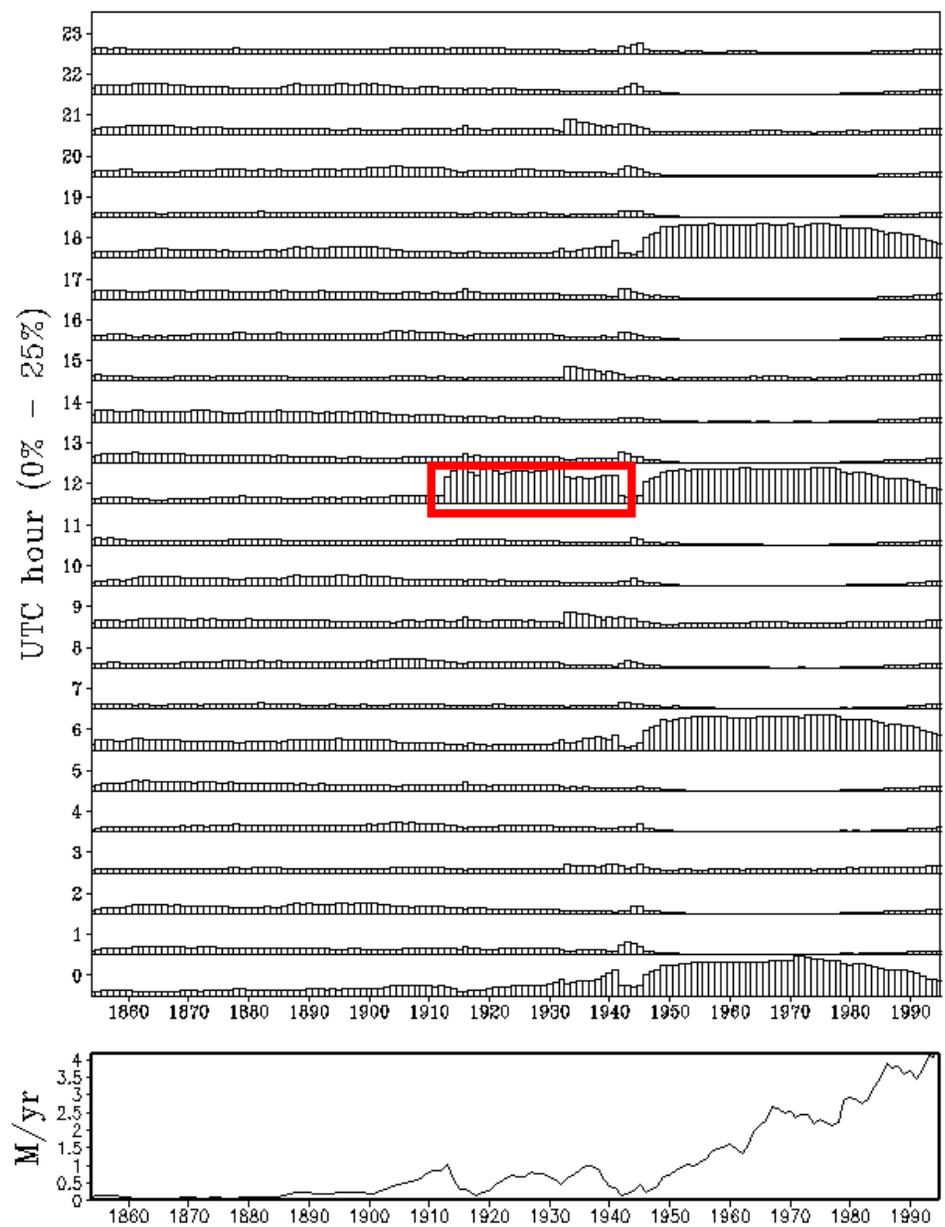
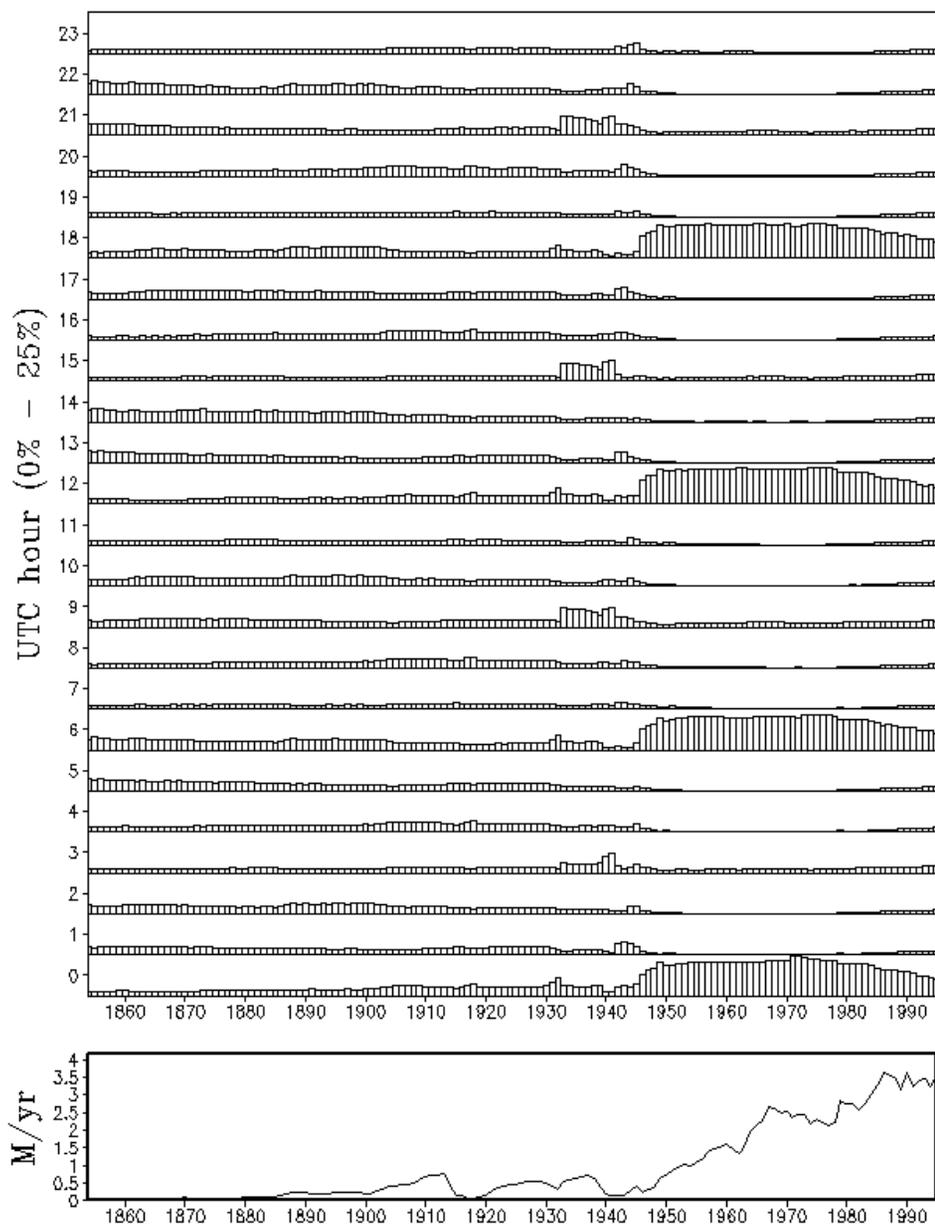
Release 1 (left)  
Release 2.0  
(right)

Note: Poster +  
planned Web  
availability



# UTC Hour Comparison

## Release 1 (left) vs. 2.0 (right)



# Processing Improvements:

## International Maritime Meteorological Archive Format (IMMA)

- Under development for WMO/JCOMM
- For countries keying historical data:
  - Simple ASCII: eliminate complex encodings
  - Logical organization, flexible and expandable
  - Core + attachments (e.g., historical vs. contemporary)
- Also for VOSClm and near-real-time data

# Processing Improvements: Near-real-time Data Delivery

Goals (NCDC taking the lead):

- Monthly extension: GTS data (only)
- Data availability: ~5 days after end of month
- Observations: IMMA format
- $2^{\circ} \times 2^{\circ}$  and/or  $1^{\circ} \times 1^{\circ}$  summaries (details tbd)

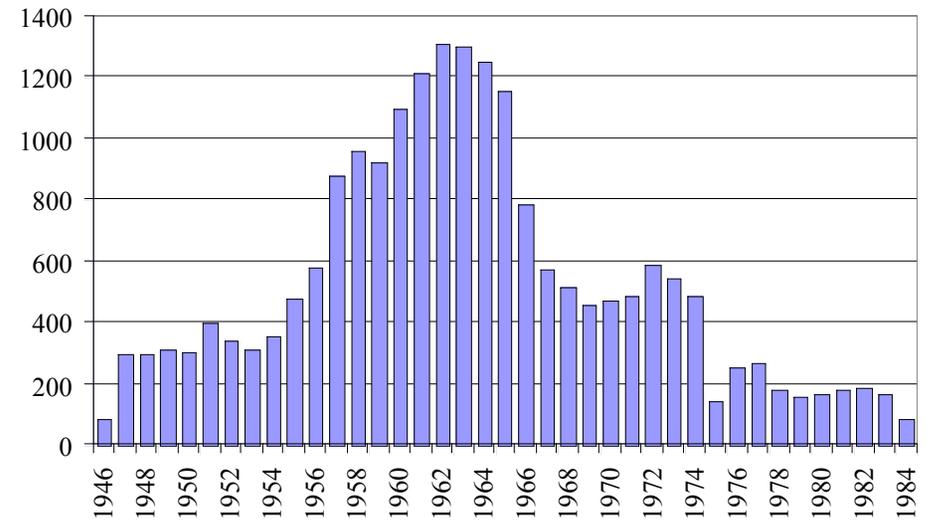
Periodically (~5 yearly evolving toward annually):  
delayed-mode updates (version tagged)  
to replace near real-time data

# Auxiliary Data Sets

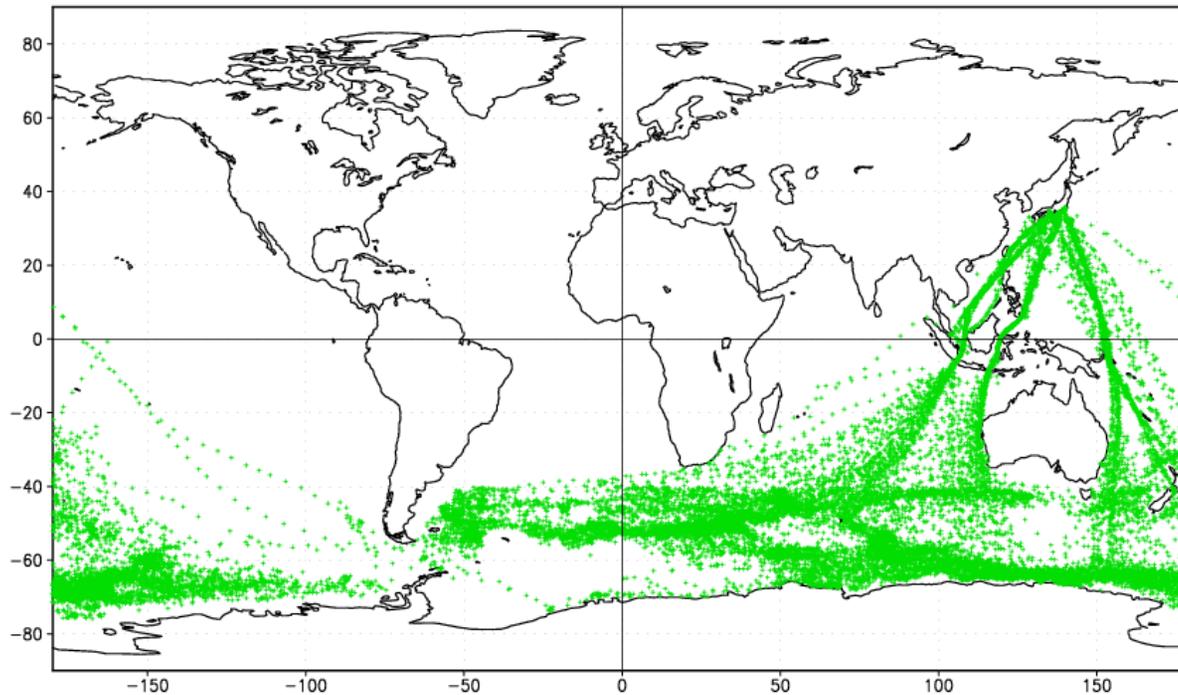
- High-priority data sets
- Likely unique data
- Prior to full blend
- Uniform formats (LMRF + IMMA)
- Examples...

# Japanese Whaling Ships (30K reports)

Japanese Whaling Ships

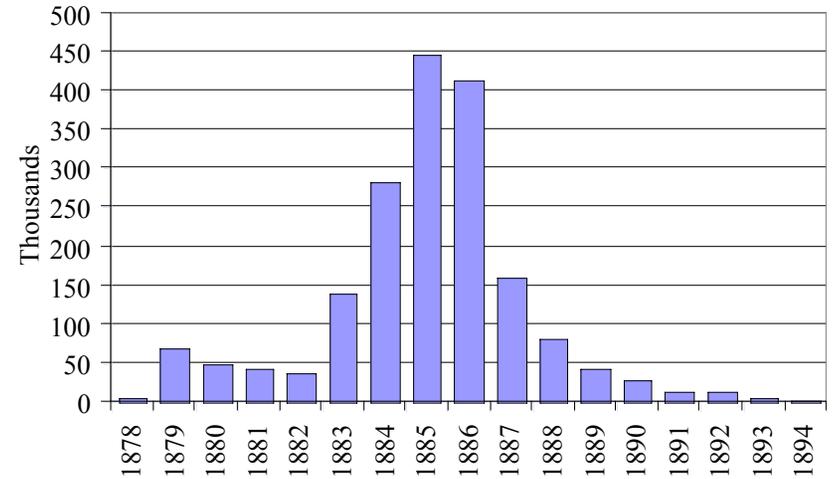


Japanese Whaling Ships 1946-1984

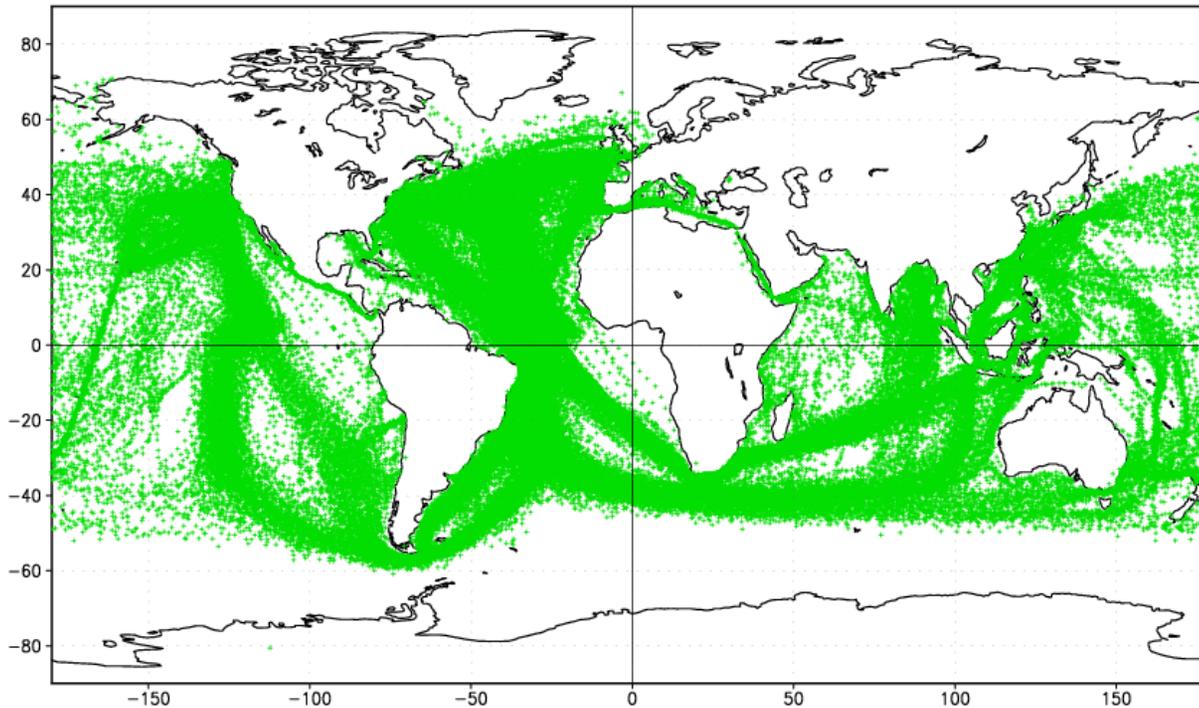


# U.S. Marine Meteorological Journals (1.8 M reports)

U.S. Marine Meteorological Journals



U.S. Marine Meteorological Journals 1878–1894



# Proposed: International marine observational archive

- COADS has evolved
- Extensive international partnerships + data
  - E.g.: China, Japan (Kobe), German, UK MDB
- New name to separate: obs  $\Leftrightarrow$  products
- Invigorate funding
- For breakout discussion?

# Vision: Shared Observational Foundation for International Products

Analyses: COADS next? UK Had? etc.

Basic stats: COADS 2°/1° UK basic etc.



International Comprehensive Ocean-Atmosphere Data Set

(ICOADS) ?

US Navy Frigate  
*Constitution*  
1854-55:  
logbook in  
German Maury  
Collection

